The Earth is flat.

This is a belief I hold as the beginning of an ongoing search for truth and certainty. It is a starting point – an intellectual foundation on which I feel further knowledge can soundly be built. Much as Descartes did in his *Meditations on First Philosophy*, I wish to start from a place of certainty and build upon it. The Flat Earth is an obvious truth to me now. My senses show me and my reason confirms it.

However, my belief that the Earth is flat is not a popular one and it is not a belief I have always held. Like most people, I was taught from an early age that the Earth is a rotating sphere which, along with a collection of other spherical bodies, revolves in an elliptical orbit around our Sun. To most of you, this will seem like an obvious and unarguable fact. It is something you have been told by teachers. Told by parents. Told by textbooks. It is something you are utterly sure of. And, more than likely, it is something you have never truly investigated.

It isn't surprising, then, that people believe so strongly that the Earth is a sphere. We are bombarded every day of our lives with information. Television, radio, books and the Internet all compete to tell us things. Society agrees that some ideas are worth debating and that others are not. The idea of a spherical Earth falls into that second category. At some point, our society decided with great certainty that the Earth is a sphere and, consequently, that further consideration is unnecessary and anyone holding an opposing viewpoint is unworthy of debate. That the Earth is spherical is a 'fact' and we are, from an early age, told to accept it without question and in the face of our own first-hand experience. But as 16th Century mathematician Pierre-Simon Laplace stated, "The weight of evidence for an extraordinary claim must be proportioned to its strangeness." The Spherical Earth model is truly extraordinary and runs contrary to all of our senses. Consequently, the burden of proof is extraordinary – and this burden has never been met. But, because the idea is so firmly ingrained in our culture, few of us bother to hold the Spherical Earth model to account.

This tendency to firmly maintain beliefs while intentionally disregarding opposing evidence – particularly evidence in the form of first-hand experience – is intellectually dishonest and unscientific. Man's quest for truth is furthered only through experience and reason. During the 19th Century, Samuel Birley Rowbotham pioneered an approach to astronomy called Zetetic Astronomy. Zeteticism stresses the importance of reason and experience over the trusting acceptance of dogma. This emphasis on experience as the only source of true knowledge dates back to ancient Greek empiricists such as Aristotle and was also prominent in the more recent British empiricism espoused by John Locke. In his *An Essay Concerning Human Understanding*, Locke states, "No man's knowledge can go beyond his experience." While second-hand 'knowledge' is often a useful tool for dealing with practical, day-to-day tasks, it should not be mistaken for truth and certainty.

Empiricism forms the foundation of the scientific method, a tremendously useful tool for learning about the world. One of the scientific method's greatest strengths – when it is practiced honestly and sincerely – is its willingness to

engage opposing data. In the preface of his book *Zetetic Astronomy: Earth Not a Globe*, Rowbotham makes the Zetetic dedication to this principle clear:

> I advise all my readers who have become Zetetic not to look with disfavour upon the objections of their opponents. Should such objections be well or even plausibly founded, they will only tend to free us from error, and to purify and exalt our Zetetic philosophy. In a word, let us make friends, or, at least, friendly and useful instruments of our enemies; and, if we cannot convert them to the better cause, let us carefully examine their objections, fairly meet them if possible, and always make use of them as beacons for our future guidance.

Despite its frequent criticism from mainstream science, the Zetetic approach to science is happy to take on board objections from its opponents because those objections will ultimately be used to strengthen the Flat Earth position.

The modern Flat Earth Society has its roots in Zetetic Astronomy. After Rowbotham's death in 1884, his followers formed the Universal Zetetic Society and continued to publish Zetetic literature in the spirit of Rowbotham's *Zetetic Astronomy: Earth Not a Globe.* In 1956, the Universal Zetetic Society became the Flat Earth Society. While the Society's focus became more religious throughout the 20th Century, the Zetetic underpinnings remained intact. In the 21st Century, the Flat Earth Society is returning to its original scientific focus and, despite its presently diminished size, is stronger than ever. We are patient because we know that the truth will ultimately be realised. Again, from Rowbotham's preface to *Zetetic Astronomy: Earth Not a Globe:*

> In all directions there is so much truth in our favour that we can well afford to be dainty in our selection, and magnanimous and charitable towards those who simply believe, but cannot prove, that we are wrong. We need not seize upon every crude and ill-developed result which offers, or only seems to offer, the slightest chance of becoming evidence in our favour, as every theorist is obliged to do if he would have his theory clothed and fit to be seen. We can afford to patiently wait, care-fully weigh, and well consider every point advanced, in the full assurance that simple truth, and not the mere opinions of men, is destined, sooner or later, to have ascendancy.

IN VERITATE VICTORIA.

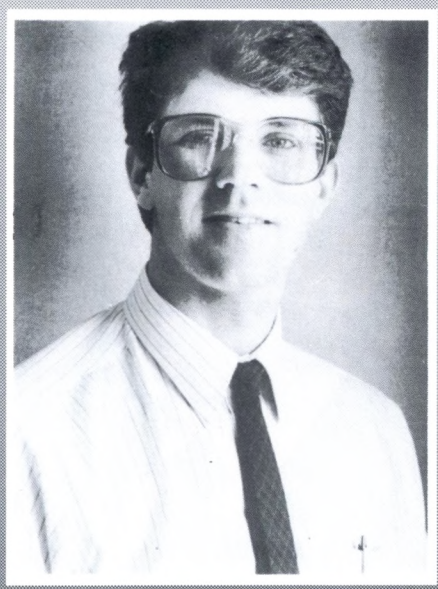
Daniel Shenton

The Flat Earth Society

The Geodesy Corner

HOW THE FLAT EARTH GOT ROUND : "AN ANCIENT HISTORY"

BY J. FERGUSON



Long before the start of recorded history, the origins of the earth's natural, physical and spiritual properties were being studied by ancient civilizations.

Several thousand years before the birth of Christ, (2000-4000 BC) it is known that the Babylonian and Egyptian empires were discovering the bases for mathematical and astronomical principles. It is a shame that the knowledge of what took place so long ago was merely a memory, and was recounted only through tales told to the first recorders of history about 1000 BC. It is not entirely true that the science of writing letters and figures began in 1000 BC. In fact, around 1650 BC, an Egyptian scribe called Ahmose wrote a treatise summarizing the ancient Egyptian mathematics, but little of the written word has been found from before this time. With the virtual elimination of the Aegean civilization in ancient Crete around 1480 BC, the age of discovery was put on hold until 700 or 800 BC. At this time, with the emergence of a "technological revolution" - the ability to produce metal products - the birth of a new civilization took place. Once again, the profound yet elementary questions of who and what we are came to the fore.

At the time of this new Greek era, there was not an abundance of educated persons capable of the discoveries that would follow. Most of the learned were labelled "philosophers", and their studies included everything from astronomy, medicine, astrology and philosophy to cult rituals and pagan worship.

One of the first philosophers to go on record with a version of what the earth looked like was the Greek Thales (b. 625 BC). It is thought that much of his work in lunar and solar motion was based on knowledge he had gained from travels to ancient Babylonia and Egypt. However, his own beliefs of the earth involved the notion that water was the key to the universe, and that the earth was a flat disk floating on an infinite ocean.

A pupil of Thales, a fellow named Anaximander, is known to be the first person to draw a map of the earth as he saw it. He envisioned a cylindrical earth (to explain the change in star positions as he travelled) about an east-west axis. He also noted that the stars rotated about the Pole star, thus coming up with the idea that the sky was a complete sphere. As opposed to Thales, Anaximander thought that the fundamental element of the universe was a mystical formless mass, although he still believed Thales' theory that life originated with water.

Yet another Greek philosopher, Anaximenes, decided that Thales had the correct notion about the earth as a flat plane or disk, but he added his idea of a fundamental substance to the equation. He thought that air was the root of the universe, and he would have a flat earth, surrounded by water, suspended by compressed air.

About the time of the deaths of Thales, Anaximander and Anaximenes, came the birth of Pythagoras (580 BC). Apart from his teachings of Pythagoreaism, a secretive cult with quite odd beliefs, and his work in mathematics, Pythagoras was the first to speculate the earth was a sphere. He also postulated on the motions of the planets, sun and moon, and his beliefs would remain valid until Kepler revolutionized orbital theories in the late 16th century AD. Carrying on the rationalist thinking of Thales, Hecataeus, a contemporary of Pythagoras, built upon the map-making work of Anaximander. He took the world as it was then known, and divided it into a north half and a south half, with Europe and Asia representing the respective halves. In this depiction, the Mediterranean Sea

HOW THE FLAT EARTH GOT ROUND : "AN ANCIENT HISTORY" cont'd

formed the dividing line and - as was common at the time - the focal point. Again, the "world" was surrounded by a vast body of water which he labelled Oceanus.

Over the next hundred or so years, navigators, astronomers and philosophers from the Greek and Phoenician civilizations followed with slightly different versions of the earth's form and size. Some were of the "flat earth" school, while others followed Pythagoras's spherical theories. It was also through this period, especially in Greece, that moral philosphy was taking over from natural philosopy, or science, as the accepted area of interest. With the teachings of philosophers such as Socrates and Plato, the study of the natural earth took a back seat for a while. It was not until some two hundred years after Hecataeus that a new map of the earth was drawn by a Greek astronomer name Eudoxus (b. 408 BC). In his works he also created a map of the stars, with divisions of the sky in terms of degrees of latitude and longitude. As we know now, these would later be applied to the earth's surface.

Among his many postulates and discoveries, one of the most important theories the great Greek philosopher Aristotle (b. 384 BC) proposed, was the reasoning behind a spherical earth. He suggested that, since stars in the south disappear, and stars in the north appear as one travels northward, the earth must be round. If it were flat, he said, all stars would be equally visible from all points on its surface. At the same time as Aristotle was revolutionizing science, the Greek geographer Dicaearchus described his version of the world, and was the first to consider the map of the world as part of a sphere. He built upon the discoveries of some of the explorers of the time, and was able to describe a line of latitude from east to west. This line showed how all points on the line saw the noonday sun at equal angles from the zenith.

Elaborating upon the work of Dicaearchus, was a Greek geographer and explorer called Pytheas (b. 300 BC). He was able to determine latitude of his home town, and was the first to point out that tides could be the result of influence by the moon. Although these ideas are entirely commonplace in the modern world, one must remember the difficulty these ancient scientists had in actually proving their theories, let alone getting anyone to believe them.

By the time the Greek Eratoshenes came on the scene, the idea of a spherical earth was becoming accepted by scholars. Eratoshenes is generally regarded as being one of the fathers of geodesy, and among his many discoveries, it is his historical measurement of the latitude between Alexandria and Aswan that made him most famous. This measurement determined the radius of the earth to be 6267 kilometres - not bad for using range poles and angles to the sun. At this point in history, Eratoshenes' world included Europe and Britain, Asia and India, and Africa south to about the Arabian Gulf. In addition, all this land was, according to Eratoshenes, surrounded by one interconnected ocean, a theory which would not be proved until Magellan circumnavigated the world in the early 16th century.

The age of more modern theories of the earth's size and shape began again in earnest in the 13th and 14th centuries, at which time many new, perhaps more scientific, discoveries were made. However, to talk about the developments from this era to the present would take a great deal more space, of which I have no more.

Thus, the earth had at last become round, and man and woman alike could live comfortably in the knowledge that they would not fall off, dare they journey too far. But didn't someone just ask me if I wanted to join the Flat Earth Society ....

Next time in the Geodesy Corner - The Connection between Datums and Ellipsoids.

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